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10/064,618	07/31/2002	Don Mark Lipkin	125686	8842

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/064,618

Applicant(s)

LIPKIN ET AL.

Examiner

Steven H VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 November 2003.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 34-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \*   c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of claims 1-33 in paper filed November 19, 2003 is acknowledged.

### *Specification*

2. The disclosure is objected to because of the following informalities: "comprisingfrom" should be "comprising from" at [0022], line 5; and "andheat" should be "and heat" at [0022], line 13.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 13-17, and 23-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose).

5. For claim 1, Applicant requires a method for protecting an article from a high temperature, oxidative environment comprising providing a substrate, providing an ion plasma deposition target comprising from about 2 atom percent to about 25 atom percent chromium and the balance comprising aluminum, and depositing a protective coating onto the substrate using the target in an ion plasma deposition process.

6. Rigney discloses a method for depositing a protective coating (col. 4, l. 40-62) comprising providing a substrate **10** and PVD depositing (col. 5, l. 21-25) a bond coat layer **24** comprising up to 50 atomic percent aluminum and 0.5-15 atomic percent chromium (Table I).
7. Rigney does not disclose the PVD depositing to be ion plasma deposition, but does indicate that the PVD can be sputtering or any other suitable deposition technique (col. 5, l. 21-25).
8. Bose discloses that a suitable technique to deposit a bond coat layer such as that used by Rigney is cathodic arc deposition [0025] which is ion plasma deposition.
9. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney to use cathodic arc deposition because it is a well known deposition method for depositing bond coat layers for turbine blades and Rigney can use any deposition method for depositing the bond coat layer of the turbine blade.
10. For claim 2, Applicant requires the target to comprise another metal such as zirconium. Rigney discloses that zirconium can be used (Table I).
11. For claim 3, Applicant requires up to 4 atomic percent of a material such as zirconium and up to about 0.2 atomic percent carbon. Rigney discloses trace amounts of carbon may be present (col. 6, l. 55-64) and 0.5 atomic percent zirconium (Table I).
12. For claim 4, Applicant requires about 9 atomic percent chromium, about 1 atomic percent zirconium, and the balance comprising aluminum. For claim 5, Applicant additionally requires about 2 atomic percent tantalum. Rigney discloses the chromium content can be 0.5-15 atomic percent (Table I), thus up to 9 atomic percent is obvious, 0.5 atomic percent zirconium (Table I)

which is about 1 atomic percent, 0.1-3 atomic percent tantalum (Table I) which is about 2 atomic percent, and 50 atomic percent aluminum (Table I).

13. For claim 6, Applicant requires about 9 atomic percent chromium, about 1.5 atomic percent of hafnium and silicon, and the balance aluminum. Rigney discloses the aluminum and chromium as noted above. Rigney also discloses 0.1-2.0 atomic percent silicon and 0.01-2.0 atomic percent hafnium (Table I) which meets Applicant's claimed limitations.

14. For claim 13, Applicant requires heat treating after depositing the protective coating. Rigney provides a heat treatment (col. 5, l. 39-40).

15. For claim 14, Applicant requires the heating to be 30 minutes to 8 hours for 700 – 1200 Celsius. Rigney discloses heat treating for 2-4 hours at about 980 Celsius (col. 5, l. 39-42).

16. For claim 15, Applicant requires the substrate to comprise nickel, iron, or cobalt alloy. For claim 16, Applicant requires the substrate to comprise superalloy. For claim 17, Applicant requires the superalloy to comprise a component for service in a hot gas path of a gas turbine engine. Rigney discloses the substrate to comprise nickel superalloy (col. 4, l. 66 – col. 5, l. 1) for use in a gas turbine engine (col. 1, l. 6-14).

17. For claim 23, Applicant requires the substrate to be grounded. Rigney does not disclose a bias on the substrate; hence, the substrate is obviously grounded.

18. For claim 24, Applicant requires the protective coating to be about 5-250 microns. For claim 25, Applicant requires the thickness to be 25-75 microns. Rigney discloses the thickness of the bond coat layer to be 10-125 microns with 15 being preferred (col. 5, l. 19-31). Thus, about 25 microns is obvious.

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19. For claim 26, Applicant requires coating the layer with a thermal barrier coating. For claim 27, the coating is YSZ. Rigney coats the layer with a YSZ layer (col. 5, l. 4-10).
20. For claim 28, Applicant requires at least 80 volume percent of a single phase. For claim 29, Applicant requires at least 80 volume percent B2 structures aluminum intermetallic phase. For claim 30, Applicant requires at least two phases. For claim 31, Applicant requires the two phases to be B2-structures aluminide intermetallic phase and platinum aluminide. Rigney discloses predominate (i.e. obviously around 90%) beta phase (col. 3, l. 10-25). Hence, there are two phases with a predominate beta phase.
21. Claims 7-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claims 1 and 30 above, and further in view of US 6,207,297 B1 to Sabol et al. (Sabol).
22. For claim 7, Applicant requires coating the substrate with a metal layer prior to depositing the protective coating. For claim 8, Applicant requires the coating to comprise platinum, palladium, nickel, or cobalt. For claim 9, Applicant requires heat treating after depositing the coating. For claim 10, Applicant requires the heat treatment to be 30 minutes to 8 hours at 900-1200 Celsius. For claim 11, Applicant requires the thickness to be 2-25 microns. For claim 12, Applicant requires the thickness to be 2-6 microns. For claim 18, Applicant requires the substrate to comprise at least one coating.
23. Rigney in view of Bose is described above, but does not deposit a layer between the substrate and the protective bond coat layer. However, the heat treatment will meet the limitation of claims 9 and 10.

24. Sabol discloses depositing a layer containing nickel or cobalt between the bond coat layer and the substrate because it acts as a barrier to diffusion materials through it from both the substrate and the basecoat (col. 4, l. 42-51). The layer has a thickness of preferably 2 microns because at greater than 25 microns, the adherence of the layers to it will suffer (col. 4, l. 51-56).

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney in view of Bose to use a nickel or cobalt containing layer between the bond coat layer and the substrate because of the desire to act as a barrier to diffusion materials through it from both the substrate and the base coat.

26. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claim 1 above, and further in view of US 5,312,584 to Frasier et al. (Frasier).

27. For claim 19, Applicant requires the target to be manufactured by casting or powder metallurgy processing.

28. Rigney in view of Bose is described above, but does not disclose the method of making the target. Thus, any method of making a target would be obvious.

29. Frasier disclose that targets can be made by casting (abstract).

30. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney in view of Bose to make the target by casting because casting is a well known method of making targets.

31. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claim 1 above, and further in view of US 4,109,061 to Beale et al. (Beale).

32. For claim 20, Applicant requires providing a negative bias on the substrate. For claim 21, the negative bias is 10-1000 volts. For claim 22, the bias is 50-250 volts.

33. Rigney in view of Bose is described above, but does not disclose biasing the substrate.

34. Beale discloses applying a negative 60 volt bias to the substrate in forming a bond coat layer to control the composition and structure of the bond coat layer (col. 4, l. 52-63).

35. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney in view of Bose to bias the substrate to negative 60 volts because of the desire to control the composition and structure of the bond coat layer.

36. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) and US 4,109,061 to Beale et al. (Beale).

37. For claim 32, Applicant requires a method for protecting an article from a high temperature, oxidative environment comprising providing a substrate of a nickel-based superalloy, providing an ion plasma deposition target comprising 2-25 atomic percent chromium, up to 4 percent of a material such as zirconium, up to about 0.2 atomic percent carbon, and the balance aluminum, depositing a protective coating on the substrate while applying a negative bias to the substrate, and heat treating the protective coating to result in a coating that comprises B2-structures aluminide intermetallic phase.

38. As noted above, Rigney discloses all of the limitations of claim 32 except for biasing the substrate and ion plasma deposition.

39. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney to use cathodic arc deposition because it is a well



known deposition method for depositing bond coat layers for turbine blades and Rigney can use any deposition method for depositing the bond coat layer of the turbine blade.

40. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney bias the substrate to negative 60 volts because of the desire to control the composition and structure of the bond coat layer.

41. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) and US 4,109,061 to Beale et al. (Beale) as applied to claim 32 above, and further in view of US 6,207,297 B1 to Sabol et al. (Sabol).

42. For claim 33, Applicant requires the substrate to be coated with a metal such as nickel and cobalt and then heat treating.

43. Rigney in view of Bose and Beale is described above, but does not disclose the use of a coated substrate. Rigney does, however, disclose the heat treating limitation. Sabol is also described above.

44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Rigney in view of Bose and Beale to use a nickel or cobalt containing layer between the bond coat layer and the substrate because of the desire to act as a barrier to diffusion materials through it from both the substrate and the base coat.

#### *Response to Amendment*

45. The objection to the specification presented in the office action mailed August 25, 2003 stands. Applicant has made corrections to paragraph 26 rather than paragraph 22. Applicant needs to cancel paragraph 26 and correct paragraph 22.

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46. The claim objections presented in the office action mailed August 25, 2003 are withdrawn in light of the amendment.
47. The 103(a) rejection of claims 1-6, 13-17, and 23-31 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) presented in the office action mailed August 25, 2003 stands.
48. The 103(a) rejection of claims 7-12 and 18 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claims 1 and 30 above, and further in view of US 6,207,297 B1 to Sabol et al. (Sabol) presented in the office action mailed August 25, 2003 stands.
49. The 103(a) rejection of claim 19 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claim 1 above, and further in view of US 5,312,584 to Frasier et al. (Frasier) presented in the office action mailed August 25, 2003 stands.
50. The 103(a) rejection of claims 20-22 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) as applied to claim 1 above, and further in view of US 4,109,061 to Beale et al. (Beale) presented in the office action mailed August 25, 2003 stands.
51. The 103(a) rejection of claim 32 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) and US 4,109,061 to Beale et al. (Beale) presented in the office action mailed August 25, 2003 stands.
52. The 103(a) rejection of claim 33 over US 6,153,313 to Rigney et al. (Rigney) in view of US 2001/0012568 A1 to Bose et al. (Bose) and US 4,109,061 to Beale et al. (Beale) as applied to

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claim 32 above, and further in view of US 6,207,297 B1 to Sabol et al. (Sabol) presented in the office action mailed August 25, 2003 stands.

*Response to Arguments*

53. Applicant has argued that Rigney does not disclose the details of the PVD processing and that Bose only discloses that it is possible to use cathodic arc to deposit such a coating. Because the details of the deposition are not disclosed, Applicant reasons that their invention is not obvious. I disagree.

54. You have not claimed any specifics of PVD processing other than the target and ion plasma deposition. Rigney discloses that the bond coat may be formed by PVD. Bose discloses that such a bond coat may be formed by cathodic arc deposition which is ion plasma deposition.

55. Cathodic arc deposition involves using a target and depositing a layer. Thus, there is inherently a target of some composition when Bose modifies Rigney.

56. The layer deposited and the target are the same composition unless reactive deposition is performed. Here, the product formed (Table I of Rigney) does not contain any reactive deposition components (i.e. no nitrogen or oxygen). Therefore, the deposition is inherently non-reactive deposition. Thus, the deposition target would be of the same composition as the produced layer.

57. In total, Rigney in view of Bose discloses ion plasma deposition of the layer disclosed in Table I of Rigney using a target containing the composition disclosed in Table I of Rigney.

58. As to Applicant's arguments regarding Beale, Beale teaches biasing the substrate, not the composition as already taught by Rigney.

### *General Information*

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (703) 308-0661.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Palestine Jenkins at (571) 272-1021.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (703) 308-0661.

### *Conclusion*

59. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

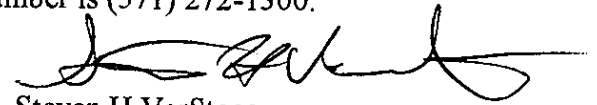
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (7:00 AM - 5:30 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1300.



Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
January 5, 2004